RCA-VICTOR CO., INC.

MODEL 280
Alignment
Trimmer location

SERVICE DATA

Electrical Specifications

Voltage Rating.....105–125 Volts
Power Consumption.....120 Watts
Type and Number of Radiotrons.....4 RCA-56, 4 RCA-58, 1 RCA-55, 2 RCA-59, 1 RCA-5Z3—Total 12
Frequency Range. 540 K. C.-1500 K. C.—1400 K. C.-2800K. C.
Undistorted Output.....10.0 Watts

This receiver is a twelve tube Super-Heterodyne radio receiver. Features such as illuminated controls, improved automatic volume control, noise suppressor, compensated volume control, class B output stage, acoustically correct cabinets and the inherent sensitivity, selectivity and tone quality of the Super-Heterodyne are included in this instrument.

A special feature is the Range Switch that allows reception of signals either of the broadcast band or higher frequencies. With the switch in the broadcast band position, the frequency range is from 540 to 1500 K. C. At the higher frequency position, the receiver covers the 1400 to 2800 K. C. band.

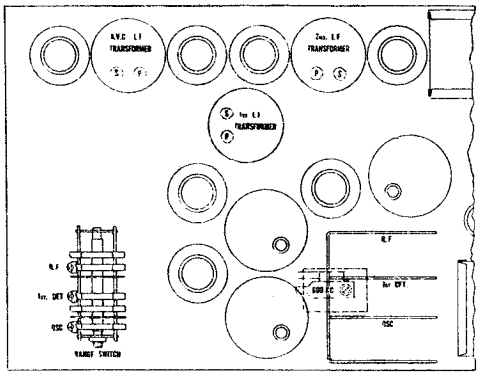

Figure C

Figure A shows the schematic circuit, Figure B the wiring diagram and Figure C the location of the adjustable capacitors. The Radiotron socket voltages, the line-up procedure and the replacement parts are given on the following pages.

R. F. and Oscillator Line-up Capacitor Adjustments

Four adjustable capacitors are provided for aligning the R. F. circuits and adjusting the oscillator frequency so that the oscillator will maintain a constant frequency—175 K. C. —difference from that of the incoming signal. Poor quality, insensitivity, poor A. V. C. action and possible inoperation of the receiver may be caused by these capacitors being out of adjustment.

If the other adjustments have not been tampered with—the intermediate transformer tuning capacitors—the following procedure may be used for aligning these capacitors.

(a) Procure an R. F. Oscillator giving a modulated signal at 600 K. C., 1400 K. C., and 2440 K. C. Also procure a non-metallic screw driver such as Stock No. 7065.

(b) An output meter is necessary. This should be a 0-10 milliammeter connected in series with the plate supply to the second detector.

(c) A dummy Radiotron RCA-56 is necessary to substitute for the one normally used in the A. V. C. socket. This should be a tube that is otherwise normal in all respects, but having one heater prong removed. Insert this tube in the A. V. C. socket.

(d) First check the chassis and carefully ascertain that the dial pointer reads exactly at the first line on the scale when the tuning capacitor rotor plates are fully meshed with the stator plates.

(e) Place the oscillator in operation at exactly 1400 K. C. and couple its output to the antenna. Set the Range Switch counter-clockwise and the dial scale at exactly 1400. Connect the output meter to the set and place the volume control and suppressor control, if noise level will permit, at its maximum position. Adjust the oscillator input so that only a slight reduction in current is obtained in the output meter.

(f) With a suitable socket wrench—the nuts are at ground potential—adjust the oscillator, first detector and R. F. line-up capacitors, until a minimum deflection is obtained in the output meter.

(g) The high frequency band is adjusted at 2440 K. C. This is done in a similar manner to the R. F. adjustments except that the oscillator is set at 2440 K. C., the dial at 1200 and the Range Switch in the clockwise position. The line-up capacitors on the Range Switch are adjusted for minimum output at this frequency.

(h) Set the oscillator at 600 K. C. Tune in the signal with the receiver until a slight deflection is obtained in the output meter. Now adjust the 600 K. C. series capacitor, Figure C, until a minimum deflection is obtained in the output meter. Rock the tuning capacitor back and forth while making this adjustment as the tuning capacitor and oscillator series capacitor adjustments interlock.

(i) Change the frequency of the oscillator to 1400 K. C. and set the dial at 1400. Again make the adjustments given under (f), (g), and then (h).

So adjusted, the R. F. circuits are properly aligned and the oscillator will maintain a constant frequency difference from the incoming R. F. signal.

I. F. Tuning Capacitor Adjustments

Although this receiver has two I. F. stages, one for the second detector and one for the A. V. C., only two of the three I. F. transformers are tuned by adjustable capacitors and require adjustment. The stage used for the A. V. C. is broadly tuned and does not require any adjustment.

The transformers are all tuned to 175 K. C. and the circuits broadly peaked.

A detailed procedure for making this adjustment follows:

(a) Procure a modulated R. F. Oscillator that gives a modulated 175 K. C. signal. Also procure a non-metallic screw driver such as Stock No. 7065.

(b) An output meter is necessary. This should be a 0-10 milliammeter connected in series with the plate supply to the second detector.

(c) A dummy Radiotron RCA-56 is necessary to substitute for the one normally used in the A. V. C. socket.

(d) Remove the oscillator tube and make a good ground connection to the chassis. Place the oscillator in operation and couple its output from the control grid of the first detector to ground. Adjust the oscillator output, with the receiver volume control at maximum, until a slightly reduced deflection is obtained in the output meter.

(e) Refer to Figure C. Adjust the secondary and primary of the second and then the first I. F. transformer until a minimum deflection is obtained in the output meter. Go through these adjustments a second time as a slight readjustment may be necessary.

When the adjustments are made the set should perform at its maximum efficiency. However, due to the interlocking of adjustments, it is good practice to follow the I. F. adjustments with the R. F. and oscillator line-up capacitor adjustments. The correct method of doing this is given in the preceding section.

Antenna Connections

It will be noted that three antenna terminals are provided at the rear of the receiver chassis. Two of these will normally be used for the usual antenna and ground connections while the third one is for use in connection with a shielded antenna system. The tap eliminates the need of the transformer usually used for coupling the shielded line to the radio receiver.

RF-5203 shield kit which comprises a combination antenna insulator, lightning arrester, transformer assembly, and 75 feet of shielded wire is recommended. When such an antenna system is used, it is necessary to connect a 200 mmfd. capacitor between terminals 1 and 2. This prevents the first R. F. circuit from being detuned and results in maximum gain from the antenna. This capacitor is included with the RF-5203 Kit. However, in event an assembly of parts from other type kits are used, it must be added.

MODEL 280
Schematic, Voltage

RCA-VICTOR CO., INC.

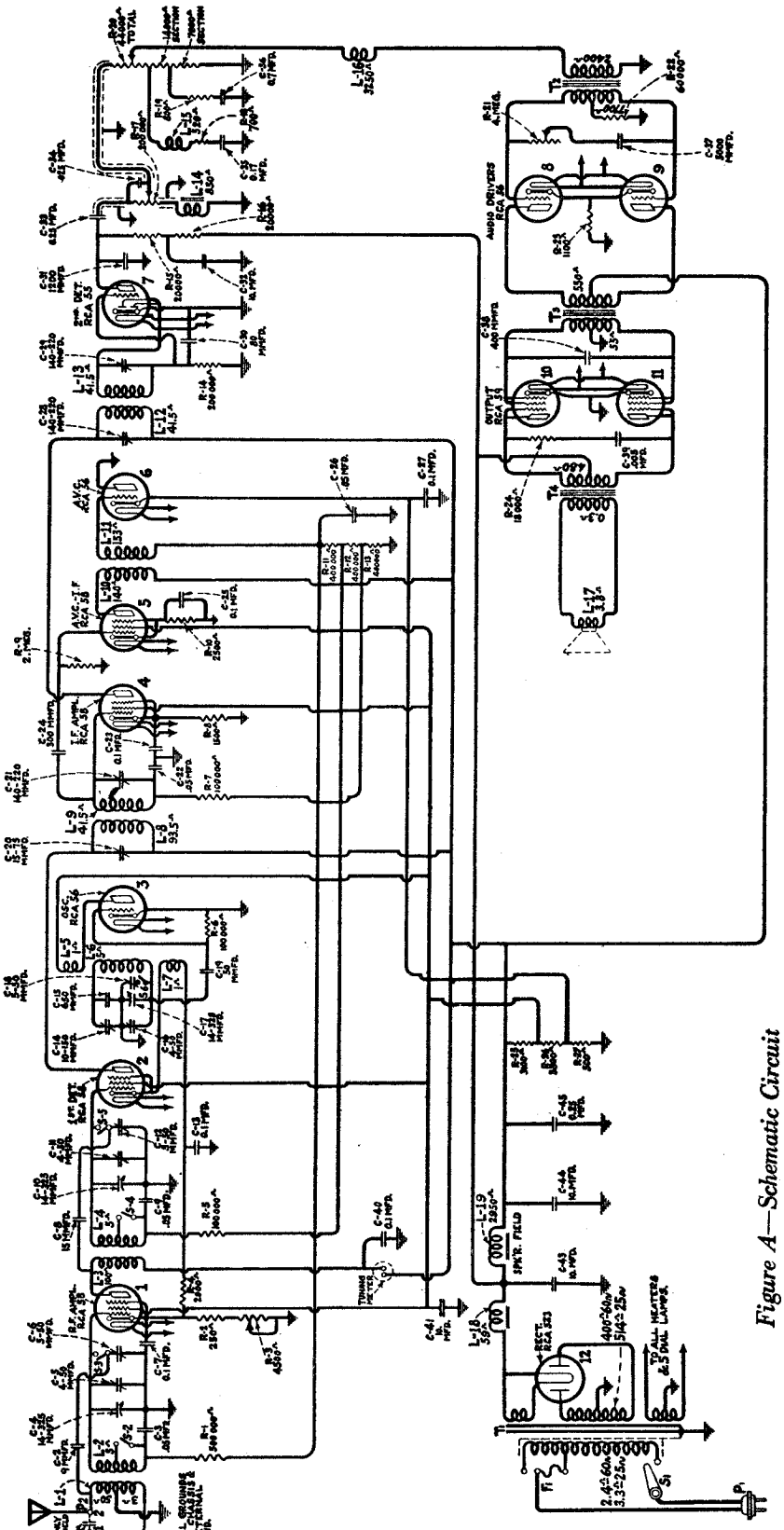

Figure A—Schematic Circuit

RADIOTRON SOCKET VOLTAGES

120 Volt A. C. Line—Volume Control and Sensitivity Control at Maximum—No signal being received

Radiotron No.	Cathode to Control Grid, Volts	Cathode to Screen Grid, Volts	Cathode to Plate, Volts	Plate Current, M. A.	Heater Volts
RCA-38 R. F.	3.1	97	212	7.5	2.5
RCA-56 Osc.	—	—	100	6.0	2.5
RCA-58 1st Det.	9.5	91	206	2.8	2.5
RCA-58 I. F.	7.5	93	208	4.0	2.5
RCA-58 A. V. C.-I. F.	8.5	92	207	3.0	2.5
RCA-56 A. V. C.	12.0	—	—	0	2.5
RCA-55 2nd Det.	0	—	74	8.0	2.5
RCA-56 A. F. Driver	11.0	—	205	5.0	2.5
RCA-56 A. F. Driver	11.0	—	205	5.0	2.5
RCA-59 Power	0	—	394	13.0	2.5
RCA-59 Power	0	—	394	13.0	2.5
RCA-523 Rect.	990-495 R. M. S.			92 Total	5.0

RCA-VICTOR CO., INC.

MODEL 280
Chassis wiring

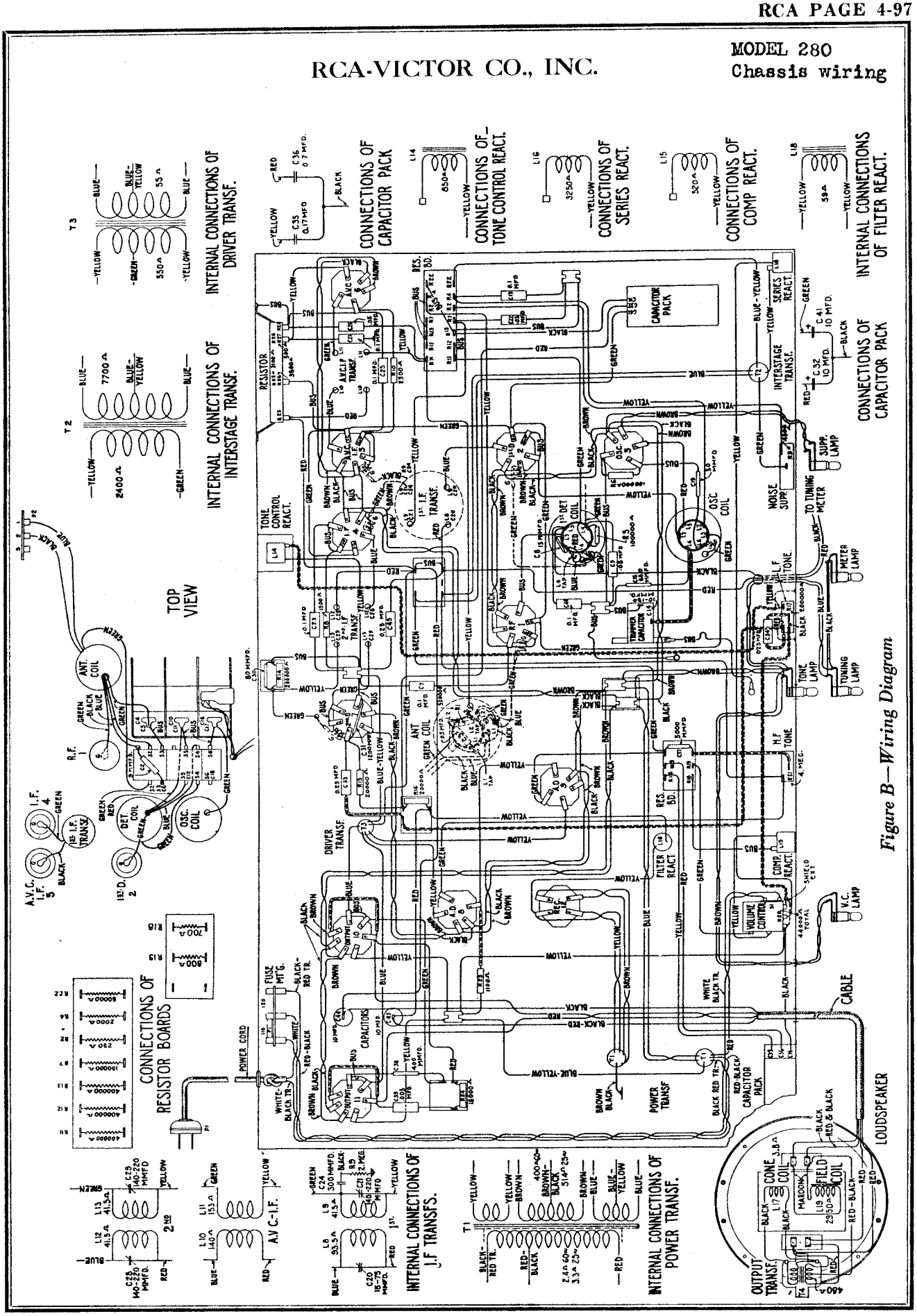

Figure B—Wiring Diagram

MODEL 280
Parts List

RCA-VICTOR CO., INC.

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
2725	Fuse—1.5 ampere—Package of 5	$0.40
2730	Resistor — 18,000 ohms — Carbon type — 1 watt—R24—Package of 5	1.10
3024	Capacitor—9 mmfd.—C2—Package of 2	.50
3047	Resistor — 1,500 ohms — Carbon type — ½ watt—R8—Package of 5	1.00
3085	Capacitor—400 mmfd.—C38	.30
3118	Resistor—100,000 ohms—Carbon type—¼ watt—R5—Package of 5	1.00
3252	Resistor—100,000 ohms—Carbon type—½ watt—R6, R7—Package of 5	1.00
3435	Resistor—250 ohms—Carbon type—½ watt—R2—Package of 5	1.00
3460	Capacitor—1,200 mmfd.—C31	.30
3526	Resistor — 2,000 ohms — Carbon type — ½ watt—R4—Package of 5	1.00
3527	Resistor—800 ohms—Carbon type—½ watt—R19—Package of 5	1.00
3529	Socket—Noise suppressor or volume indicator lamp socket	.32
3533	Shutter — High frequency tone control shutter	.50
3534	Shutter — Low frequency tone control shutter	.50
3535	Socket—High or low frequency indicator lamp socket	.32
3548	Knob—High or low frequency tone control knob	.24
3551	Screw assembly—Chassis mounting washer and screw assembly—Comprising 4 screws, 4 lockwashers, 4 washers, 8 cushions and 4 spacers—One set	.68
3556	Capacitor—0.05 mfd.—Located on antenna coil—C3	.34
3558	Capacitor—50 mmfd.—C19	.36
3563	Socket—Tuning meter lamp socket and bracket	.32
3564	Bracket—Station selector dial lamp bracket	.25
3565	Socket—Dial lamp socket	.50
3597	Capacitor—0.25 mfd.—C33, C45	.40
3615	Knob—Range switch knob—Package of 5	.60
3638	Scale—Tuning meter scale—Package of 5	.60
3640	Capacitor—0.05 mfd.—C9, C22, C26	.25
3641	Capacitor—0.1 mfd.—C7, C13, C23, C25, C27	.35
3643	Capacitor—0.005 mfd.—Output stage—In series with 18,000 ohm resistor—C39	.25
3719	Socket—7 contact Radiotron socket	.30
3726	Arm—Range switch operating arm assembly—Comprising arm, link, studs and set screws	.45
3727	Shaft—Shaft and bushing assembly for range switch operating arm—Comprising two washers, shaft, bushing and nut	.30
3747	Capacitor—15 mmfd.—C8	.36
3749	Capacitor—0.1 mfd.—Tuning meter filter—C40	.30
3765	Capacitor—0.025 mfd.—C34	.34
3774	Resistor—7,400 ohms—Tapped at 3,800 and 500 ohms—R25, R26, R27	.80
3780	Shutter—Noise suppressor shutter	.30
3781	Shutter—Volume control shutter	.30
3782	Shield—Radiotron shield—Second detector	.26
3797	Reactor — Volume control compensating reactor—L15	.64
3798	Resistor—700 ohms—Carbon type—½ watt—R18—Package of 5	1.00
3799	Capacitor—80 mmfd.—C30	.70
5817	Resistor — 20,000 ohms — Carbon type — 3 watts—R15, R16—Package of 5	.25
6186	Resistor — 500,000 ohms — Carbon type — Located on antenna coil—R1—Package of 5	1.00
6192	Spring—Three gang tuning condenser drive cord tension spring—Package of 10	.30
6228	Resistor—200,000 ohms—Carbon type—½ watt—R14—Package of 5	1.00
6280	Resistor—400,000 ohms—Carbon type—½ watt—R11, R12, R13—Package of 5	$1.00
6281	Resistor — 1,100 ohms — Carbon type — ½ watt—R23—Package of 5	1.00
6282	Resistor—60,000 ohms—Carbon type—½ watt—R22—Package of 5	1.00
6288	Knob—Volume control or noise suppressor knob—Package of 5	1.00
6298	Cord—Three gang tuning condenser drive cord—Package of 5	.60
6300	Socket—4 contact Radiotron socket	.35
6312	Capacitor—650 mmfd.—C15—Package of 5	1.50
6316	Resistor — 2,500 ohms — Carbon type — ½ watt—R10—Package of 5	1.00
6323	Shaft—Three gang variable tuning condenser drive shaft—Comprising 1 shaft, 2 "C" washers and 2 flat washers—Package of 2	.20
6437	Coil—Oscillator coil—L5, L6, L7	1.24
6447	Volume control complete with mounting nut—R20	1.92
6448	Tone control—Low frequency tone control complete with mounting nut—R17	1.04
6449	Tone control—High frequency tone control complete with mounting nut—R21	1.06
6450	Rheostat—Noise suppressor rheostat—R3	1.24
6461	Meter—Tuning meter	2.14
6512	Capacitor — 0.005 mfd. — High frequency tone control—C37	.28
6536	Capacitor—3 gang variable tuning condenser assembly	5.00
6537	Switch—Range switch—L3, L4	1.30
6539	Coil—Detector coil—L3, L4	1.44
6541	Scale—Dial and dial scale	.75
6547	Bezel—Tuning meter bezel	.45
6561	Coil—Antenna coil—L1, L2, R1	1.65
6562	Transformer—Driver transformer—T3	3.04
6563	Reactor—Volume control series reactor—L16	1.06
6564	Transformer—First intermediate frequency transformer—C20, C21, C24, L8, L9, R9	2.30
6565	Transformer—Second intermediate frequency transformer—L10, L11	2.10
6566	Transformer—Third intermediate frequency transformer—C28, C29, L12, L13	1.72
6567	Capacitor pack—Comprising one 0.17 mfd. and one 0.7 mfd. capacitors—C35, C36	.95
6568	Transformer—Interstage audio transformer—T2	3.10
6571	Capacitor—10.0 mfd.—C43, C44	1.20
6572	Reactor—Tone control reactor—L14	.90
6574	Capacitor pack—Comprising two 10.0 mfd. capacitors—C32, C41	1.80
6578	Reactor—Filter reactor—L18	3.22
6618	Cable—Braid covered—4 conductor—reproducer cable	.54
7062	Capacitor—Adjustable trimming capacitor—15 to 70 mmfd.	.50
7065	Screw driver—Non-metallic screw driver for oscillator and I. F. adjustments	.80
7439	Drum—Dial drum with set screw and three dial mounting nuts	.35
7484	Socket—5 contact Radiotron socket	.35
7485	Socket—6 contact Radiotron socket	.40
7487	Shield—Radiotron shield	.25
7488	Shield—Radiotron shield top	.20
9028	Transformer—Power transformer—105–125 volts—50–60 cycles—T1	7.75
9029	Transformer—Power transformer—105–125 volts—25–50 cycles	12.25
9030	Transformer—Power transformer—200–250 volts—50–60 cycles	8.00
	REPRODUCER ASSEMBLIES	
6184	Board—Terminal board complete with three terminals—Package of 5	.50
6569	Transformer—Output transformer—T4	1.95
8920	Ring—Cone retaining ring	.35
8969	Cone—Reproducer cone—L17—Package of 5	6.35
9031	Coil assembly—Comprising field coil, magnet and cone support—L19	4.90